Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
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Interference Immunity Performance Specifications for Radio Receivers	)	ET Docket No. 03-65
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Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television	)	MM Docket No. 00-39
	)	

COMMENTS OF THE
SATELLITE INDUSTRY ASSOCIATION

The Satellite Industry Association ("SIA") hereby submits these comments on the Commission's Notice of Inquiry ("NOI") in this proceeding, which initiates an inquiry into the possibility of developing certain receiver interference immunity performance specifications as part of the Commission's spectrum policy. SIA addresses those issues raised in the NOI that relate to the provision of satellite-based services.

SIA is a U.S.-based national trade association representing the leading U.S. satellite manufacturers, service providers, and launch service companies. SIA serves as an advocate for the U.S. commercial satellite industry on regulatory and policy issues common to its members. With its member companies providing a broad range of manufactured products and services, SIA represents the unified voice of the U.S. commercial satellite industry. SIA Executive Members include: The Boeing Company; Globalstar, L.P.; Hughes Network Systems, Inc.; ICO Global Communications; Intelsat;

Lockheed Martin Corp.; Loral Space & Communications Ltd.; Mobile Satellite Ventures; Northrop Grumman Corporation; PanAmSat Corporation; and SES Americom, Inc. SIA's Associate Members include Inmarsat, New Skies Satellites Inc, and Verestar Inc.

As a general matter, SIA endorses the Commission's stated intent not to implement a new regulatory regime that generally would subject all receivers to mandatory standards.[1] SIA agrees with the Commission's recognition that "mandatory standards could also stifle innovation by restricting the introduction of products with otherwise desirable new features that are inconsistent with the standards."[2] The satellite industry has extremely compelling market-based incentives to use spectrum efficiently, flexibly and cooperatively, and to improve the performance of satellite equipment, including receivers.[3] SIA believes these longstanding practices and incentives in the satellite industry are consistent with the Commission's desire to use market-based means to provide flexibility in establishing and managing guidelines for receiver immunity.[4]

Satellite operators have every incentive to deploy systems that are resistant to interference and use spectrum as efficiently as possible. The nature of the satellite business makes it essential that satellite network designs maximize the performance possible from the limited power, spectrum, and orbital resources available. There are practical limitations on the maximum amount of power that can be generated in orbit, and on the number of orbital locations and spectrum available for any satellite service. In

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1 NOI at ¶ 2.

2 *Id*. at ¶ 37.

3 SIA has not taken a position on the spectrum sharing issues in IB Docket 01-185 (involving spectrum flexibility for MSS licensees). These comments are not intended to address those issues and should not be read as doing so.

4 NOI at ¶ 2.

addition, use of satellite spectrum is not only regulated by the Commission, but also limited by treaty-based provisions in the ITU's International Radio Regulations. All of these factors drive satellite networks to be as spectrally and power efficient as possible.

Moreover, satellite networks require significant capital investment and take long periods of time to design, construct, launch, and place into operation. A typical GSO spacecraft costs hundreds of millions of dollars to implement, and NGSO systems cost even more. Once placed into orbit, satellites are not capable of being modified or repaired during their long design lives. These factors, coupled with the current frequency congestion in many satellite bands, provide additional market-based motivations for satellite licensees to develop and deploy interference-resistant and spectrally-efficient receivers.

Today's satellite networks are more efficient, and the services they provide are available to a wider class of users, than ever before. The enhanced capabilities of today's satellite networks have been enabled by a regulatory approach that has fostered continued and significant technological evolution in satellite network design. And, if this type of regulatory approach continues, SIA believes that the future presages continued technological advances, and corresponding public interest benefits.

The higher-data-rate and lower cost services offered on today's spacecraft have been facilitated by, among other technological advances, spacecraft receive antennas with greater G/T performance, and the use of higher order modulation schemes. Such better-performing satellite receive antennas allow the implementation of smaller spot beams, and support the use of smaller, lower cost, lower power earth terminals operating at higher data rates. Similarly, the development of new modulation schemes,

such as 8PSK and 16QAM, allow more information to be transmitted in even less bandwidth. As a result of these advancements in design, satellite networks now provide greater overall capacity, achieve a higher level of frequency reuse, and share spectrum with other satellite networks on a geographically closer basis, than ever before.

Similarly, advances in earth terminal technology over the past few decades have fostered the use of satellite services by a wider range of users. Earth terminals have shrunk in size, use lower powered amplifiers, and are less expensive and less obtrusive than ever before. The history of earth terminal development demonstrates that "market forces," rather than regulation, have driven continued improvements in receiver performance in the satellite industry.

In particular, the performance of many Ku-Band earth terminal receivers has improved by as much as 6 dB over the past 20 years. Much of this improvement has occurred by lowering the noise floor generated by the terminal itself. Greater spectrum efficiency also is achieved by use of advanced coding and modulation techniques. However, as the NOI recognizes,[5] these technological advances also affect the susceptibility of receivers to interference. Higher order modulation schemes that allow information to be transmitted in less bandwidth typically require a higher C/N ratio, and therefore are more sensitive to interference.

Lowering the noise floor of receivers also allows the use of smaller antennas. The reduction in antenna size is a trend that is reflected across the satellite industry. FSS earth terminal antennas in the Ku-band that once were several meters in diameter have been reduced in size to less than one meter without compromising performance. Moreover, MSS terminal antennas that once were as large as one meter in diameter, and

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[5] *Id.* at ¶ 13.

had to be permanently mounted, are now as small and as portable as a laptop computer, and in some cases, are handheld devices.

The Commission therefore is correct to consider the impact of receiver specifications on innovation in the marketplace.[6] The types of advances in FSS and MSS satellite networks described above, were driven, in large part, by improved performance of satellite earth terminal receivers themselves. Those developments now make it possible to deliver Internet access, video, data, and other services directly to users, who, but for the ability to use a small, inexpensive, and unobtrusive antenna, would not have access to a competitive telecommunications offering.

Many of the advances in the satellite industry described above have occurred because the Commission had the foresight to set aside certain frequency bands for use by satellite networks, introduce blanket licensing, and provide sufficient flexibility to enable satellite networks to evolve as technology continues to advance. For example, technical criteria locking satellite networks into the multiple-meter diameter antennas of yesterday would not have allowed the use of today's sub-meter earth terminal antennas by individuals and businesses. Similarly, technical criteria keyed to the G/T performance of spacecraft antennas ten years ago would not have facilitated the use of today's small earth terminal antennas.

The "price" associated with the technologies that yield such great efficiencies in satellite network operations is that satellite networks – and in particular receiver performance – are increasingly sensitive to interference from other sources. For example, higher-gain satellite receive antennas are more susceptible to receiving signals

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[6] *See id.* at ¶ 37.

from unwanted sources, and higher-order modulation techniques are more sensitive to interference due to their higher carrier-to-noise ratio requirements.

Likewise, there are some simple laws of physics that affect the susceptibility of satellite receivers to interference. As the NOI recognizes, [7] an inescapable fact about satellite receivers is that they need to be sensitive enough to receive low-level signals from 22,300 miles in outer space. This characteristic, coupled with the ability to tune a receiver over the wide range of frequencies employed by most satellite networks, renders earth terminal receivers highly susceptible to interference from nearby, high-powered transmitters.

For these reasons, SIA believes that satellite operators are subject to compelling incentives – namely, the challenges of operating in outer space and the resulting need to maximize spectrum efficiency – that continue to drive improvements in receiver technology. SIA therefore urges the Commission to avoid imposing satellite receiver standards, particularly those that would unduly constrain the continued deployment of more advanced and spectrum-efficient technologies. Competitive and economic forces perform this function best, and this has long been true for satellite services. Any attempt to impose receiver standards in the satellite context by regulatory fiat could stifle innovation and freeze today's satellite technology in place. Satellite operators should be free to implement new technologies and improve the quality of their service. Otherwise, they may lose the ability to provide services that are competitive with terrestrial offerings and available throughout the U.S. at prices that are distance insensitive.

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[7] *Id.* at ¶ 27.

Respectfully submitted,

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